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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,313	02/24/2005	Rudolfus Antonius Theodorus Maria Van Benthem	4662-333	1606

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EXAMINER

CHEUNG, WILLIAM K

ART UNIT PAPER NUMBER

1713

DATE MAILED: 12/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/502,313

Applicant(s)

VAN BENTHEM ET AL.

Examiner

William K. Cheung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 072304.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 3, 4, 6, 10 are objected to because of the following informalities: Claims 3, 4, 6, 10 fail to end the claims with a period. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 9-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Ulmer et al. (US 5,759,522).

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*The invention of claim 9 relates to a **copolymer of maleic anhydride and alkyl vinyl ether**, characterized in that wherein a molecular weight distribution, expressed as **Mw/Mn, is less than 2.0**.*

*The invention of claim 10 relates to a **hydrolyzed or alcoholized copolymer of maleic anhydride and alkyl vinyl ether**, wherein the molecular weight distribution, expressed as **Mw/Mn, is less than 2.0**.*

Ulmer et al. (col. 3, line 48-55) disclose a copolymer of maleic anhydride and alkyl vinyl ether having a molecular weight distribution ranging from about 1.8 to about 2.2 which fully embrace the claimed molecular weight distribution of less than 2.0. Further, Ulmer et al. (col. 4, line 10-46) clearly disclose that the disclosed polymers are esterified and solvent exchanged with ethanol to give the copolymer of claim 10. Claims 9-10 are anticipated.

4. Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by Franz et al. (DE 42 36 058 A1).

*The invention of claim 11 relates to an **apparatus for conducting the process of claim 1**, which comprises a **loop reactor**, which is connected through a tube to a*

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post reactor, the post reactor being constructed in such a way that plug flow can be obtained.

Franz et al. (English Abstract; figure) disclose an apparatus comprising a loop reactor connected through a tube to a post reactor, wherein plug flow dominates. Claim 11 is anticipated.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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6. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ulmer et al. (US 5,759,522) in view of Franz et al. (DE 42 36 058 A1).

The invention of claims 1-8 relates to a process for the preparation of a copolymer of maleic anhydride and an alkyl vinyl ether, comprising the steps of supplying maleic anhydride and the alkyl vinyl ether and an initiator, together forming a feed flow, through an inlet to a reactor wherein maleic anhydride and the alkyl vinyl ether react to a copolymer of maleic anhydride and alkyl vinyl ether which forms a reaction mixture with the maleic anhydride, the alkyl vinyl ether and the initiator, characterized in that the process is a continuous process and the reactor is a loop reactor, optionally followed by a post-reactor, wherein the reaction mixture is internally circulated, whereby this reaction mixture arrives again at the inlet before the maleic anhydride and alkyl vinyl ether have completely reacted and while a remainder of initiator is still present.

Ulmer et al. (col. 4, line 10-46) disclose a process for preparing a copolymer of maleic anhydride (MW=98 g/mol) and methyl vinyl ether (MW=58 g/mol), in the presence of an initiator (MW=280.28 g/mol) and acetone (MW=58 g/mol). The MVE/MA ratio is calculated to be 1.2, which meets the requirement of claim 4. The polymerization reaction is carried out 70-80°C.

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Ingredients	MW (g/mol)	Weight (lb)	Weight (g)	mole
MA	98	5225	2370020.133	24183.88
MVE	58	3713	1684188.47	29037.73
Initiator	280.28	209	94800.80533	338.2361
Acetone	58	1033	468560.9182	8078.637
Ratio				
		MA/initiator	71.5	
		MVE/MA	1.200706154	

The difference between the Ulmer et al. and claims 1-8 is that Ulmer et al. are silent on a continuous process for preparing the copolymer of Ulmer et al.

Franz et al. (English Abstract; figure) disclose an apparatus comprising a loop reactor connected through a tube to a post reactor, wherein plug flow dominates. Since Franz et al. (abstract) clearly indicate that the disclosed apparatus is suitable for development of continuous radical bulk polymerization of vinyl monomers containing small amount of solvent and/or initiator to achieve high polymerization conversion with a high space-time yield, it would have been obvious to one of ordinary skill in art to apply the apparatus and process teachings of Franz et al. into Ulmer et al. for preparing a copolymer of maleic anhydride and an alkyl vinyl ether to obtain the process invention of claims 1-8, especially when the disclosed copolymer are incorporated into hair spray application where the cost of production is critical.

Regarding the claimed feature "remainder of initiator is still present", the examiner has a reasonable basis that such feature is inherently possessed in Franz et al. since Franz et al. are silent on a step or apparatus for removing the residual initiators from the disclosed polymerization process.

Regarding claim 3, although the process as described in Ulmer et al. only disclose a MA/initiator mole ratio of 71.5, motivated by the expectation of success of converting the polymerization process of Ulmer et al. with the continuous polymerization teachings in Franz et al., it would have been obvious to one of ordinary skill in art to perform some "routine optimization" experimental work to optimize the ratio "MA/initiator" of Ulmer et al. to obtain the "MA/initiator" as claimed.

Regarding the "subsequent heating of a temperature of between 120 to 220 °C" to reduce the free MA to below 10 parts per million, Ulmer et al. (col. 4, line 32-33) clearly disclose that the residual MA in the final product is substantially absent, which indicates that the claimed "subsequent heating of a temperature of between 120 to 220 °C" is a non-critical step as claimed. To obtain the valid patent, applicants are required to submit evidence to show the criticality of the claimed "subsequent heating of a temperature of between 120 to 220 °C".

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Franz et al. (DE 42 36 058 A1) in view of Judat et al. (US 6,627,174).

*The invention of claim 12 relates to an **apparatus for conducting the process of claim 9, the loop reactor comprising a stirred tank reactor (207) which is fitted with an optional pitch bladed or MIG mixer (209), a draft tube (210) and a helicon mixer (211) in an annular part.***

Franz et al. (English Abstract; figure) disclose an apparatus comprising a loop reactor connected through a tube to a post reactor, wherein plug flow dominates.

The difference between the invention of Franz et al. and claim 12 is that Franz et al. do not explicitly disclose that the stirred tank reactor to be fitted with a draft tube and a helicon mixer in an annular part.

However, since Franz et al. (English Abstract; figure) clearly disclose the apparatus comprising a tank reactor with stirring capability. Further, Judat et al. (abstract; figures 1-6) disclose a stirred tank reactor fitted with a draft tube and a helicon mixer in an annular part. Motivated by the improved stability of the mixing (col. 2, line 50-53), it would have been obvious to one of ordinary skill in art to replace the reactor of Franz et al. with the reactor of Judat et al. to obtain the invention of claim 9.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Franz et al. (DE 42 36 058 A1) in view of Sakata et al. (JP 02046279).

Franz et al. (English Abstract; figure) disclose an apparatus comprising a loop reactor connected through a tube to a post reactor, wherein plug flow dominates.

The difference between the invention of Franz et al. and claim 12 is that Franz et al. do not explicitly disclose that the stirred tank reactor to be fitted with a draft tube and a helicon mixer in an annular part.

However, since Franz et al. (English Abstract; figure) clearly disclose the apparatus comprising a tank reactor with stirring capability. Further, Sakata et al. (abstract; figures 1-6) disclose a stirred tank reactor fitted with a draft tube and a helicon mixer in an annular part. Motivated by the improved effective reaction provided by the stirred blades of Sakata et al. (English abstract), it would have been obvious to one of ordinary skill in art to incorporate the mix-blade teachings of Sakata et al. into the reactor teachings of Franz et al. to obtain the invention of claim 9.

Conclusion

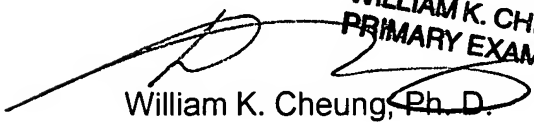
Any inquiry concerning this communication or earlier communications from the examiner should be directed to William K. Cheung whose telephone number is (571)

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272-1097. The examiner can normally be reached on Monday-Friday 9:00AM to 2:00PM; 4:00PM to 8:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David WU can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


WILLIAM K. CHEUNG
PRIMARY EXAMINER

William K. Cheung, Ph.D.

Primary Examiner

December 2, 2006